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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,372	02/26/2004	ERH-KUN LAI	12680-US-PA	2371

31561 7590 03/20/2006

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE  
7 FLOOR-1, NO. 100  
ROOSEVELT ROAD, SECTION 2  
TAIPEI, 100  
TAIWAN

EXAMINER
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WARREN, MATTHEW E

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/708,372

Applicant(s)

LAI, ERH-KUN

Examiner

Matthew E. Warren

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 12-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

This Office Action is in response to the Remarks filed on January 3, 2006.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 12-14, 16-22, and 24-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Thei et al. (US 6,335,249 B1).

In re claims 12 and 20, Thei et al. shows (fig. 3) a shallow trench isolation structure comprising: a substrate having a trench therein; an insulating layer (12), disposed in the trench, wherein the insulating layer has an upper surface higher than an upper surface of the substrate; and a liner layer (24) of CVD nitride (col. 6, lines 40-60) formed over the substrate covering the insulating layer. The liner layer inherently protects the shallow trench isolation from external stress or thermal effects because it has the same structure and materials as the applicant's claimed invention.

In re claims 13 and 21, Thei et al. shows (fig. 3) that the liner extends to an upper surface of the substrate to cover it.

In re claims 14 and 22, Thei et al. discloses that the liner has a low etching selectivity relative to the insulating layer because the liner is made of SiN and the insulating layer is made of oxide (col. 6, lines 40-60).

In re claims 16, 17, and 24, Thei et al. discloses that the liner is an insulating layer of silicon nitride (col. 6, lines 40-60).

In re claims 18 and 25, Thei et al. shows (fig. 3) that a pad oxide (12) is formed between the liner and the substrate.

In re claims 19 and 26, Thei et al. shows (fig. 3) that another insulating layer (28) covers the liner layer.

Claims 12-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al. (US 6,211,022).

In re claims 12 and 20, Lin et al. shows (fig. 2) a shallow trench isolation structure (204) comprising: a substrate having a trench therein; an insulating layer (204), disposed in the trench, wherein the insulating layer has an upper surface higher than an upper surface of the substrate; and a liner layer (212) of CVD nitride (col. 2, line 52 - col. 3, line 5) formed over the substrate covering the insulating layer. The liner layer inherently protects the shallow trench isolation from external stress or thermal effects because it has the same structure and materials as the applicant's claimed invention.

In re claims 13 and 21, Lin et al. shows (fig. 2) that the liner extends to an upper surface of the substrate to cover it.

In re claims 14 and 22, Lin et al. inherently discloses that the liner has a low etching selectivity relative to the insulating layer because the liner is made of SiN and the insulating layer is made of oxide (col. 2, lines 52-63).

In re claims 15 and 23, Lin et al. (col. 3, lines 1-5) that the liner has a thickness of 180 Angstroms, which fits the range listed in the claim.

In re claims 16, 17, and 24, Lin et al. discloses that the liner is an insulating layer of silicon nitride (col. 2, lines 52-63).

In re claims 18 and 25, Lin et al. shows (fig. 2) that a pad oxide (204) is formed between the liner and the substrate.

In re claims 19 and 26, Lin et al. shows (fig. 2) that another insulating layer (216) covers the liner layer.

### ***Response to Arguments***

Applicant's arguments filed with respect to claims 12-26 have been fully considered but they are not persuasive. The applicant primarily asserts that the prior art references do not show all of the elements of the claims, specifically that Thei does not show that the liner protects the shallow trench isolation from external stress or thermal effects and that FOX region of Lin is not a shallow trench isolation. The examiner believes that the cited references teach each and every limitation of the claims. In re the arguments against Thei, although Thei teaches that the liner layer is used as an etch stop, that fact does not preclude said layer from also functioning to protect the STI from stress and heat. Although the processes of forming the Thei's STI differs from the process of the instant invention, the end result is the same. The structure and materials of the STI having the liner is the same as the applicant's claimed invention, therefore the liner would also function to protect the STI from stress and heat just as the

applicants have discovered. The applicant has merely discovered a new or additional benefit of having said liner layer. The claims pertain to a device and there is nothing in the claim language that would structurally distinguish the applicant's claimed invention from the invention of Thei. Therefore, Thei shows all of the limitations of the claims and the rejection is proper.

In re the arguments that Lin does not disclose a shallow trench isolation (STI) but a field oxide region (FOX). There is nothing in the language of the claims that is structurally distinguishable from Lin's FOX region. Both have the same structure of an insulating layer disposed in a trench and a liner formed over the substrate covering the insulating layer. The applicant seem to suggest that the FOX of Lin, being formed by a thermal oxidation process, is not the same as the STI of the applicant's claims, but the structure of the claims is the same as the structure of Lin's FOX region. Thus Lin anticipates the claims and this rejection is final.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (571) 272-1737. The examiner can normally be reached on Mon-Thur and alternating Fri 9:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MEW  
*MEW*  
March 15, 2006



KENNETH PARKER  
SUPERVISORY PATENT EXAMINER